



88017961

1989

PLAN OF WORK

for
Cooperative Hydrology Investigations

Bureau of Land Management and U.S. Geological Survey — Water Resources Division

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USGS/BLM COOPERATIVE HYDROLOGY
INVESTIGATIONS PROGRAM

1989

PLAN OF WORK

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Preface

The Bureau of Land Management (BLM) each year requires data collection and analysis and technical consulting services of its sister agency, the U.S. Geological Survey (GS). For Fiscal Year 1989 services are requested of the GS's Water Resources Division.

The Plan of Work includes both Federal Coal Management Program (CMP) and non-CMP work items. Non-CMP work items are identified by a separate BLM appropriation code included in each work item description. Agency technical contacts for the 1989 BLM/GS contract are as follows:

Bureau of Land Management

Service Center

Eric B. Janes, Contracting Officer's Representative, and Hydrologist
(FTS 776-0170).

U.S. Geological Survey

Water Resources Division

Donald A. Goolsby, Regional Energy Coordinator, Central Region
(FTS 776-5937)

Donald L. Coffin, Regional Program Officer, Central Region
(FTS 776-5929)

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SUMMARY OF BLM FUNDS FOR HYDROLOGIC INVESTIGATIONS
USGS WATER RESOURCES DIVISION
1989

	Coal	Uranium	SWA	Non-energy Leasable	SWA O & C	
STATE	4120	4144	4340	4143	6333	TOTAL
Colorado	\$141,000		\$ 57,120	\$7,100		\$205,220
Idaho			6,200			6,200
Montana			50,000			50,000
Nevada			56,500			56,500
Oregon					19,230	19,230
Utah			21,130			21,130
Washington		20,000			6,000	26,000
TOTALS	\$141,000	\$20,000	\$190,950	\$ 7,100	\$ 25,230	\$384,280

PLAN OF WORK
for
HYDROLOGIC INVESTIGATIONS
BUREAU OF LAND MANAGEMENT AND
USGS WATER RESOURCES DIVISION
Fiscal Year 1989

AUTHORITY

The General Agreement between the Bureau of Land Management (BLM) and the Geological Survey (GS), dated June 14, 1985, is considered the basis for this Plan of Work.

PURPOSE

The purpose of this Plan of Work is to specify the nature and amount of assistance to be provided by GS to BLM during FY 89.

SCOPE

This Plan of Work includes hydrologic services to be provided by GS to BLM in Fiscal Year 1989 in the States of Colorado, Idaho, Montana, Nevada, Oregon, Utah, Washington, and Wyoming.

GS will provide the services, including personnel, equipment, supplies, and facilities, to conduct water resources investigations in areas designated by BLM. Services will include installation, operation, and maintenance of surface-water gages, ground-water wells, and climate stations, water-quality data collection and analysis.

PROCEDURE

Fiscal Year 1989 is the fifteenth year of this cooperative effort. Some work that began in earlier fiscal years will be continued in Fiscal Year 1989, although some projects may be dropped. A few studies will begin in Fiscal Year 1989; some will carry over into Fiscal Year 1990. Proposals will be discussed in joint meetings among GS WRD District Offices, BLM State Offices, and the Service Center. The Plan of Work will be developed by the Service Center after negotiations among BLM field offices to determine needs and GS field offices to determine capabilities, recommended hydrologic procedures, and to coordinate with other studies conducted by GS in other programs. The development of budgets takes into account the program needs of both agencies and funds available to meet those needs. When mutual interests are strong, funds from both agencies are applied. Funds tabulated in the work order, however, represent only those from BLM.

Field investigative procedures will be standard GS techniques for water resources investigation.

REPORTS

Reporting will generally be standard GS report procedures with some deviations that are detailed in the Plan of Work.

For some investigations, annual project progress reports will be prepared by Water Resources Division Districts and routed through the Central Region to the Contracting Officer's Representative (BLM). Due date for these reports will be September 30, 1989. GS will provide the appropriate BLM State Office with a copy of each progress report.

Prior to publishing any work involving BLM funds, GS will forward copies of the draft final project report to the appropriate BLM State Office contact for review and approval. GS will forward two copies of the published reports to the Contracting Officer's Representative (BLM) and as many copies to the appropriate BLM State Office as agreed upon mutually between GS and BLM.

FUNDING

BLM will provide \$384,280 to GS to cover all authorized work listed in this Plan of Work and performed during the period October 1, 1988 to September 30, 1989. Billing will be through OPAC Form, which will be current as of the beginning of the quarter during which the interagency agreement is signed. OPAC bill must reflect the agreement number with applicable task identified and BLM fund code along with a brief description of the work, e.g., project title as listed in this work plan. Subsequent bills will be issued at 3-month intervals except during the last quarter when bills will be submitted at 1- to 2-month intervals. As a part of the interagency agreement and/or modifications thereto, BLM will provide a table showing funding sources for BLM/USGS cooperative hydrology investigations. GS will consider this account a reimbursable account with 1-year funds.

COLORADO

SUMMARY OF FUNDS - FY 89
WATER RESOURCES DIVISION

Project Name	4120	4340	4143
I. Hydrology of Coal Spoils, NW Colorado	90,000		
II. Operation of BLM Stations, San Luis		25,420	
III. Hydrologic Investigations, Badger Creek		21,100	
IV. Sand Wash Sediment		10,600	
V. Foidel Creek Monitoring	5,000		
VI. Yellow Creek Monitoring			7,100
VII. Yoast Report	20,000		
VIII. C-a Track Water Quality	26,000		
TOTAL:	\$141,000	\$57,120	\$ 7,100

Total for State of Colorado: \$205,220

COLORADO

Neil Morck, BLM, State Director (FTS 776-1721)

Betsy Daniel, BLM, Hydrologic Investigations Coordinator (FTS 776-1778)

Steve Vandas, BLM, State Hydrologist (FTS 776-1762)

C.A. (Jerry) Pascale, WRD, District Chief (FTS 776-4882)

I. Hydrology of Coal Spoils in NW Colorado (RDTs 3340.187)

Robert S. Williams, Jr., WRD Project Chief, FTS: 776-9404

- A. Location: The study area is located in northwestern Colorado between Steamboat Springs and Craig and extends from an east-west line from the Yampa River at the north to approximately 20 miles south of the Yampa River.
- B. Objectives: This project will describe the processes controlling the hydrology of reclaimed coal spoils:
 - 1. Determine the sources of recharge to and discharge from reclaimed coal spoils.
 - 2. Determine the rate of water movement through reclaimed coal spoils.
 - 3. Determine the geochemistry of a reclaimed coal spoil and the magnitude of change in concentrations of dissolved constituents in coal-spoil discharge.
- C. Approach: The general approach will be to select two or three reclaimed coal-spoil sites for study. Available surface-water, ground-water, and water-quality information will be used in conceptualizing the hydrology of potential sites. Unreclaimed and reclaimed old spoil piles exist in the vicinity of current mining activities. The water chemistry of unreclaimed and old reclaimed spoil piles will be analyzed to evaluate long-term water-quality trends. The information obtained from the old spoil piles could be very valuable for determining if estimates of duration of mining impacts are accurate.

One of the first efforts in the study will be to compile and evaluate available data for coal-spoil sites. Precipitation gages, stream gages, wells, and soil water access tubes that have been installed from previous investigations will be assessed to determine if they can be used for the study. Sites that have sufficient data and available onsite instrumentation that meet the study needs will be designated as priority sites for the proposed study.

D. Reports:

Progress Reports

USGS-WRD, with assistance and input from other advisory team members, will give one or more annual oral presentations describing progress and significant results. The purpose of these presentations will be to provide preliminary information to interested groups as soon as possible.

Final Interpretative Report

USGS-WRD will prepare a Water-Resources Investigation Report or a Water Supply Paper upon completion of the study.

Regulatory-Management Reports

Some advisory team representatives intend to produce separate management-related reports based upon results from the USGS-WRD final interpretive report. These reports will discuss the regulatory program implications of the investigative conclusions of the study.

D. Distribution of Funds:

Project costs will be shared by BLM and OSM. During FY 89 BLM's share will be \$90,000. Funds are available at YA-320-4540-10-2512.

II. Operation of BLM Stations in San Luis Valley

Russell K. Livingston, WRD Project Chief, (303) 544-7155

- A. Location: Five study sites in San Luis Valley--one reservoir site (change in contents) and four reservoir sites (inflow). Recording rain gages are operated at five sites. Twenty supplemental nonrecording rain gages are also operated to provide spatial definition of precipitation.
- B. Objectives: To determine effects of land-use changes on small drainage area runoff. Daily flow and rainfall will be tabulated for the four reservoir sites.
- C. Report Products: Data are published annually in Water Resources Data for Colorado.
- D. Distribution of Funds: (CO-050-4341-14-2512):

Salaries	\$22,320
Travel and Vehicles	<u>3,100</u>
TOTAL	\$25,420

III. Hydrologic Investigation of Badger Creek

Russell K. Livingston, WRD Project Chief, (303) 544-7155

- A. Location: Badger Creek, tributary to Arkansas River
- B. Objectives: To determine surface-water quantity and sediment-yield characteristics of Badger Creek watershed at two data collection sites. Crest stage gages will also be operated at four sites in the Badger Creek watershed to determine source areas of flood discharge.
- C. Report Products: Data are published annually in Water Resources Data for Colorado.
- D. Distribution of Funds (CO-930-4341-06-2512):

Salaries	\$14,480
Travel and Vehicles	2,730
Laboratory	<u>3,890</u>
TOTAL	\$21,100

IV. Sand Wash Sediment

Robert L. Tobin, Meeker Office, (303) 878-5086

- A. Location: Sand Wash Basin is in northwestern Colorado, approximately 50 miles west-northwest of Craig.
- B. Objectives: To continue to collect flow, sediment, and water-quality data to define the hydrologic characteristics of Sand Wash Basin.
- C. Approach: Operate a continuous flow-gaging station and periodically collect samples of suspended and bedload sediment, and water quality to define variations with stage. Yearly data collection includes:
1. Suspended sediment . . . 5-15 samples.
 2. Suspended-sediment size analyses . . . 1-4 samples.
 3. Bedload . . . 1-4 samples.
 4. Water chemistry . . . 1-4 samples.
- D. Reports: All data will be published in Water Resources Data for Colorado.
- E. Distribution of Funds (CO-010-4340-14-2512):

Manpower	\$ 6,710
Vehicles and Travel	1,340
Laboratory	1,930
Supplies & Equipment	<u>620</u>
 TOTAL	 \$10,600

V. Foidel Creek Monitoring

Robert L. Tobin, Meeker Office, (303) 878-5086

- A. Location: The upper Foidel Creek basin is approximately nine miles west of Oak Creek, Colorado. Foidel Creek is a minor tributary in the Fish Creek-Trout Creek drainage system of the Yampa River basin.

Objective: Operate a continuous recording precipitation gage and collect snow course data in the upper Foidel Creek basin. Collect periodic water-quality data at the USGS gaging station on upper Foidel Creek.

Approach:

1. Maintain continuous data collection at the USGS precipitation gage 401751107062000.
 2. Collect snow depth and water content at gage 401751107062000 . . . 2-3 measurements per year.
 3. Collect water samples for laboratory analyses of major ions at the USGS gaging station 09243800 in upper Foidel Creek . . . 4 samples per year.
- D. Reports: All data will be published in the USGS annual water-data report.
- E. Distribution of Funds (CO-010-4120-06-2512):

Manpower	\$ 3,280
Vehicles and Travel	920
Laboratory	310
Supplies & Equipment	<u>490</u>
 TOTAL	 \$ 5,000

VI. Yellow Creek Monitoring

Robert L. Tobin, Meeker Office, (303) 878-5086

- A. Location: Yellow Creek originates in the Cathedral Bluffs of western Piceance basin and flows north to its confluence with the White River, 27 miles west northwest of Meeker, Colorado.
- B. Objective: Operate a streamgaging station near the mouth of Yellow Creek to continuously monitor discharge. Collect periodic water samples for laboratory analyses to define the variations in water quality and sediment characteristics that occur with changes in discharge. The data are needed to assess impacts from existing and proposed mining activities in Piceance basin.
- C. Approach:
1. Maintain the U.S. Geological Survey gaging station, Yellow Creek near Rangely - 09306255, as a continuous flow site.
 2. Collect water samples for major ions and nutrients . . . 4 samples/year.
 3. Collect water samples for suspended sediment . . . 4 samples/year.
- D. Reports: All data will be published in the USGS annual water-data report.
- E. Distribution of Funds (CO-010-4143-17-2512):

Manpower	\$ 5,030
Vehicles and Travel	700
Laboratory	400
Supplies & Equipment	<u>970</u>
 TOTAL	 \$ 7,100

VII. Hydrogeologic and Geochemical Characterization of the Yoast Area:

Bob Williams, WRD Project Chief, FTS 776-4886

- A. Location: The study area is located in northwestern Colorado 25 miles west and 8 miles south of Steamboat Springs, Colorado, within the Sage Creek Drainage.
- B. Objective: This project will provide a compilation and statistical summary of available surface- and ground-water data on the undisturbed, natural hydrologic regime of a coal lease area in northwestern Colorado. The report will include a comprehensive description of water chemistry in the bedrock and alluvial aquifers, equilibrium conditions, flow paths, and interactions between hydrologic systems.
- C. Approach: All available data will be compiled and summarized in a U.S. Geological Survey Water-Resources Investigations Report. Types of data include: water levels, chemical constituents for wells and surface water, continuous climatological information, slug and pump test data, and streamflow records. When compilation of the data is complete, a detailed, comprehensive description of the hydrogeologic and geochemical system of this area will be provided through statistical and graphical techniques.
- D. Reports: All data and interpretation will be published in a U.S. Geological Survey Water-Resources Investigations Report.
- E. Distribution of Funds (CO-010-4120-06-2512): The funding will be shared equally by three agencies including the U.S. Bureau of Land Management, Routt County, and the U.S. Geological Survey. U.S. Bureau of Land Management's share is \$20,000.

VIII. C-a Tract Water Quality

Robert L. Tobin, Meeker Office, (303) 878-5086

- A. Location: Retort #1 lies within the oil shale lease tract C-a. Tract C-a is in the west central part of Piceance basin in northwestern Colorado. The tract is in Rio Blanco County approximately 18 miles southeast of Rangely and 36 miles west southwest of Meeker.
- B. Objective: Collect water samples for laboratory analyses of inorganic and organic constituents from the spent retort #1 and from ground water at several locations proximal to retort #1. Data will be collated with data from previous collections and summarized in tabular and graphical formats. The data formats will facilitate the assessment of water quality conditions and changes that occurred with time within the retort.
- C. Approach:
1. Collect water samples for analyses of common ions, trace constituents, and selected organics from four levels in retort well RAM-7.
 2. Collect water samples for the above analyses from 3-5 ground-water sources outside but proximal to retort #1. These data will be used to assess the nature and movement of contaminants from retort #1.
 3. Integrate data collected in 1989 with similar data collected in 1983, 84, 85, and 86. Data will be presented in table and graphic formats that show water-quality characteristics with ground-water depth and changes with time.
- D. Reports: Data will be tabulated and provided to the BLM.
- E. Distribution of Funds (CO-010-4120-06-2512):

Manpower	\$ 7,130
Vehicles and Travel	520
Laboratory	18,150
Supplies & Equipment	<u>200</u>
 TOTAL	 \$ 26,000

IDAHO

SUMMARY OF FUNDS - FY 89
WATER RESOURCES DIVISION

Project	4340	Total
I. Operation and Maintenance of Gaging Station	\$ 6,200	\$ 6,200
Total for the State of Idaho:	\$ 6,200	

IDAHO

Delmar D. Vail, BLM State Director (FTS 554-1401)

Ervin Cowley, BLM Hydrologic Investigations Coordinator (FTS 554-1892)

Jerry L. Hughes, WRD District Chief (FTS 554-1750)

I. Operation and Maintenance of One Gaging Station

Robert W. Harper, WRD Project Chief (FTS 554-1750)

A. Location:

1. Lolo Creek, near Greer, ID

B. Data Collection: October 1, 1988 through September 30, 1989.

C. Reports: To be published in the USGS Water Resources Data for Idaho.

D. Distribution of Funds:

One station (ID-060-4340-14-2512)	6,200
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TOTAL	<u>\$ 6,200</u>
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MONTANA

SUMMARY OF FUNDS - FY 89
WATER RESOURCES DIVISION

Project	4340
I. Hydrologic Characterization	\$ 50,000
TOTAL	\$ 50,000
Total for State of Montana:	\$ 50,000

MONTANA

Marvin LeNoue, BLM Montana State Director (FTS 585-6461)

Peter Bierbach, BLM Hydrologic Investigations Coordinator (FTS 588-7930)

Joe A. Moreland, WRD, District Chief (FTS 585-5302)

I. Hydrologic Characterization of Eastern Montana Coal Areas (BLM-RDTS-7210.102/3340.502)

Ronald R. Shields, WRD Project Chief (FTS 585-5263)

- A. Objectives: To collect streamflow data at key locations to supplement other programs. These data are essential in defining runoff and water quality from potential impact areas, determining streamflow characteristics, and providing a data base from which future changes can be analyzed.
- B. Procedure: Standard U.S. Geological Survey methods of surface-water and water-quality data collection will be used to obtain data at the following stations:

Tongue River at Tongue River Dam-Q
Rosebud Creek at mouth near Rosebud-S,Q
Hanging Woman Creek near Birney-S,Q
Armell's Creek near Forsyth-S,Q
Otter Creek at Ashland-S,Q
Small drainage program-S
(Rosebud Creek near Kirby, (Timber Creek near Van Norman, and
Clear Creek near Lindsay)

S = Streamflow Q = Water quality

- C. Report Products: Basic records from streamflow sites will be submitted to BLM annually or as mutually agreed upon. Records will be published by USGS in an annual report, Water Resources Data for Montana.
- D. Relationship to Other USGS Studies: This program will supplement and will be correlated with other USGS streamflow data collection programs. Numerous other stations are operated in this area.

5. Distribution of Funds:

Salaries	\$28,000
Laboratory	10,000
Travel	9,000
Supplies	1,000
Data Processing	<u>2,000</u>
TOTAL	\$50,000

- E. Funding is MT-930-4340-14-2512.

NEVADA

SUMMARY OF FUNDS - FY 89
WATER RESOURCES DIVISION

Project	4340
<hr/>	
I. Maintenance and Operation of Three Stream Gages	\$ 38,500
II. Operation and Maintenance of One Stream Gage	\$ 7,500
III. Installation and Operation of Stream Gage	\$ 10,500
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TOTAL	\$ 56,500

Total for State of Nevada: \$ 56,500

NEVADA

Edward F. Spang, BLM Nevada State Director (FTS 470-5451)

Jim McLaughlin, BLM Hydrologic Investigations Coordinator (FTS 470-5455)

William J. Carswell, Jr., WRD, District Chief (FTS 470-5656)

I. Operation and Maintenance of Three (3) Gaging Stations. Craig Westenberg, Project Chief, (FTS 575-1770)

A. Location:

Ely District and Las Vegas District, Nevada.

B. Objectives:

1. To collect streamflow and water quality data for Las Vegas Wash Meadow Valley Wash, and Muddy River.
2. To provide data for estimating the magnitude of salt contributions from public lands.
3. To develop rational salinity control plan.

C. Product Output:

1. Basic data will be published annually in the USGS annual water data report for Nevada.
2. A summary report will be prepared presenting the salt budgets.

D. Distribution of Funds:

Streamflow records	\$22,500
(hourly data, daily record)	
Specific conductance monitor	9,000
(hourly data, daily record)	
Periodic TDS, sediment samples, reconnaissance samples, data compilation and analysis	7,000

TOTAL	\$38,500
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E. Funding Code:

NV-931-4340-14-2515

II. Operation and Maintenance of Stream Gage

A. Location: Six Mile Creek near Warm Springs, NV. (Sta. 10246930)

B. Product Output:

1. Data from this gage will be entered into WATSTORE and published in the annual report "Water Resources Data for Nevada."
2. BLM Districts will be provided a year-end station analysis.

C. Distribution of Funds:

Operation and Maintenance of Gage	\$ 7,500
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D. Funding Code: NV-930-4340-14-2515

III. Installation and Operation of Stream Gage

A. Location: Dixie Creek near Elko, Nv. (Station Number to be assigned)

B. Product Output:

1. Data from this gage will be entered into WATSTORE and published in the annual report "Water Resources Data for Nevada."
2. BLM Districts will be provided a year-end station analysis.

C. Distribution of Funds:

Equipment and Installation Costs for Gage	\$ 3,500
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Operation and Maintenance of Gage	\$ 7,000
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TOTAL	<hr/> \$10,500
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D. Funding Code: NV-930-4340-14-2515

OREGON

SUMMARY OF FUNDS - FY 89
WATER RESOURCES DIVISION

Project	6333
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I. Operation and Maintenance of Stream Gages	\$19,230
Total	\$19,230
Total for State of Oregon:	\$19,230

OREGON

Charles W. Luscher, BLM State Director (FTS 429-6251)

Bill Brookes, BLM Hydrologic Investigations Coordinator (FTS 429-2253)

M.D. Fretwell, WRD State Office Chief (FTS 429-2009)

I. Operation and Maintenance of Three Stream Gages

- A. Location:
1. Tucca Creek near Blaine, Oregon (OR 080)
 2. East Fork Lobster Creek near Alsea, Oregon (OR-080)
 3. Star Gulch near Ruch, Oregon (OR-110)

B. Product Output:

1. Data from these gages will be entered into WATSTORE and published in the annual report Water Resources Data for Oregon.
2. BLM Districts will be provided primaries and a year-end station analysis for these gages.

C. Distribution of Funds (6333-14):

O & M of three gages @ \$6,410	\$19,230
TOTAL	\$19,230

UTAH

SUMMARY OF FUNDS - FY 89
WATER RESOURCES DIVISION

Unita-Southwestern Utah Coal Region

Project	4340
I. Cooperative State Programs (UT-1, 3, and 4)	\$21,130
II. Rock fractures and coal cleats and their effect on ground-water hydrology in the coal fields of central Utah	
TOTALS	\$21,130

Total for State of Utah: \$21,130

UTAH

Kemp Conn, Acting BLM State Director (FTS 588-5311)

Boyd Christensen, BLM Hydrologic Investigations Coordinator (FTS 588-3120)

Harvey Lee Case III, WRD District Chief (FTS 588-5663)

I. Cooperative State Programs (UT-1, 3, and 4)

Larry Herbert, Project Chief (FTS 588-4192)

- A. Objectives: To determine the sediment, salinity, and discharge of selected streams in San Juan and Garfield Counties.
- B. Approach: Operate and maintain sediment, water quality, and gaging stations during FY 89.
- C. Report Products: Information will be included in annual basic data report. BLM may request data directly if needed.
- D. Distribution of Funds:

UT-1 Collection of streamflow records.

FY 89

Indian Creek	\$ 5,450
Bull Creek	5,450
Montezuma Creek (Cost shared with SCS)	<u>2,730</u>

SUBTOTAL	\$13,630
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UT-3 and 4 Collection of chemical quality, and sediment records.

Bull Creek	\$ 5,000
Montezuma Creek (Cost shared with SCS)	<u>2,500</u>

SUBTOTAL	\$ 7,540
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TOTAL	\$21,130
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- E. Cost coding is UT-932-4340-14-2512

WASHINGTON

SUMMARY OF FUNDS - FY 89
WATER RESOURCES DIVISION

Project	4144	6333	Total
I. Collect and analyze water samples from Midnight Mine	\$20,000		\$20,000
II. Sediment Sample Analysis		<u>6,000</u>	<u>6,000</u>
		\$6,000	\$26,000

Total for State of Washington: \$26,000

WASHINGTON

Charles W. Luscher, BLM State Director (FTS 429-6251)
Bill Brookes, BLM Hydrologic Investigations Coordinator (FTS 429-2253)
Gerald D. Parker, WRD, District Chief (FTS 390-6510)

I. Analyze Water Samples - Midnight Mine

- A. Location: Surface drainage and three pits of Midnight Mine, Stevens County, Washington.
- B. Objectives: To collect and analyze water samples from surface drainage and three pits, install two staff gages in pit #3.
- C. Report Products: Data will be stored in WATSTORE. Analytical results will be provided to BLM.
- D. Distribution of Funds (OR-920-4144-06-2512):

Salaries and benefits	<u>\$20,000</u>
TOTAL	\$20,000

II. Sediment Sample Analysis

- A. Location: Collect approximately 1,000 samples at various field sites, Salem District.
- B. Product Output: Data will be entered into WATSTORE. Lab sheets (analytical results) will be provided to the Salem District, BLM.
- C. Distribution of Funds (OR-080-6333-14-2512):

Salaries	<u>\$6,000</u>
TOTAL	\$6,000

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